**PDA Differentiating Science Instruction for All Students**

**Objectives**

At the completion of the module, participants will know, understand, and be able to do the following.

**Unit 1**

1. Participants will define the following terms as they relate to differentiating instruction:

* Responsive learning environment
* Respectful tasks
* Flexible grouping
* Formative assessment
* Pre-assessment
* Summative assessment
* Clarity about the learning goal
* Know-Understand-Do (KUD)
* Readiness
* Interest
* Learning profile/preferences
* Differentiated assignments
* Interim assessment

2. Participants will be able to do the following:

* Evaluate current practice related to the guidelines of differentiated instruction.
* Discuss the rationale for differentiation.
* Make the connection between meaningful differentiation and continuous assessment.
* Identify the characteristics of a responsive learning environment.
* Identify a variety of grouping practices.
* Define "respectful work."
* Explain KUDs.

3. Participants will understand the following key ideas:

* Planning for meaningful differentiated instruction begins with the teacher’s clarity about what is most important for students to know, understand, and be able to do.
* Planning for meaningful differentiated instruction is dependent upon ongoing assessment before, during, and after instruction so the teacher may adjust lesson content, format, and supports to respond to students’ needs.
* In a differentiated environment, there is a combination of whole- group, small-group, and partner work, as well as individual assignments.
* Meaningful differentiated instruction utilizes respectful work, determined by assessment information and linked precisely to clear learning goals, which is engaging, interesting, and challenging for each student.
* Meaningful differentiation is not a program and is more than any one particular instructional strategy, tool, activity, or lesson.
* In a differentiated environment each student is valued for his or her contributions and has multiple opportunities to contribute to others and to learn from others' contributions.

**Unit 2**

1. Participants will have knowledge of the following:

* Next Generation Sunshine State Standards (NGSSS) and Access Points
* National Science Education Standards
* Current research about how students learn science
* Inquiry and non-inquiry instructional strategies for teaching science

1. Participants will be able to do the following:

* Identify common science misconceptions.
* Identify potential barriers to science achievement.
* Explain the process of conceptual change
* Provide an example of how preconceptions a student brings to the differentiated science classroom can affect learning.
* Explain inquiry strategyfor teaching science.

1. Participants will understand the following key ideas:

* The levels of complexity addressed in the NGSSS Access Points and current research about how students learn science are important aids for the differentiation of science instruction.
* The use of current, research-based science teaching strategies can improve engagement and achievement for all students.

**Unit 3**

* 1. Participants will knowthe meaning of the following terms as they relate to differentiating science instruction:
* Clear Learning Goals
* Pre-Assessment
* Summative Assessment
* Ongoing Assessment
  1. Participants will know types and sources of assessment information appropriate for science.

3. Participants will be able to do the following:

* Explain how pre-assessments, ongoing assessments and summative assessments differ in purpose.)
* Write specific science KUDs, design and implement an appropriate pre-assessment task, and describe how assessment results will be used to inform the instructional process.)

4. Participants will understand the following key ideas:

* Meaningful differentiation is dependent upon the teacher's clarity about the learning goals for science students.
* Pre-assessment is critical to determine what students “know” and what they “don’t know.” Continuous assessment helps teachers to adjust lesson content, format, and supports in response to students' needs.
* The practice of pre-assessment informs the instructional planning process and supports the guidelines for differentiating science instruction.

**Unit 4**

1. Participants will know and apply the following terms:

* [Whole-Group Instruction](javascript:;)
* [5E Model of Instruction](javascript:;)
* [Active Engagement](javascript:;)
* [Wait Time](javascript:;)
* [Reciprocal Teaching](javascript:;)

2. Participants will be able to do the following:

* Identify components of whole-group instruction.
* Compare and contrast teaching for thinking and understanding versus traditional learning.
* Determine when whole-group instruction is appropriate.
* Integrate technology during whole-group instruction.

3. Participants will understand the following key ideas:

* Guidelines for differentiating instruction should be considered when planning whole-group instruction.
* When effective science practices are matched to learners' needs during whole-group instruction, engagement and achievement increase.

**Unit 5**

1. Participants will know the following key ideas as they relate to planning for flexibly grouping students:
   * Purposes and considerations when grouping students
   * Explicitness of directions
   * Provision for continuous assessment of individual students within groups for individual student accountability.
2. Participants will be able to do the following:

* Purposefully group students based on a sound rationale drawn from pre-assessment and continuous whole-class assessment data.
* Set appropriate learning goals for groups and plan science group learning activities.
* Integrate continuous assessment for students in flexible groups
* Deliver a science mini-lesson that addresses important flexible grouping practices.

1. Participants will understand the following key ideas:
   * Types of flexible groups, levels of teacher support and explicitness, and appropriate learning activities need to be matched to students’ science learning needs.
   * Small group instruction needs to be most explicit for students who are struggling.
   * When based on student needs, methods of teacher delivery can effectively keep students actively and meaningfully engaged.
   * Flexible groups can be used to build student proficiency and mastery of targeted science concepts and skills.
   * Flexible groups can be used to extend understanding of science concepts and skills.
   * Assessment needs to be more frequent as students go through the process of modifying preconceptions of a science concept to more closely approach a scientifically accepted concept.

**Unit 6**

1. Participants will be able to define the following terms as they relate to planning for science

instruction:

* [5E Model of Instruction](javascript:;)
* [Active Engagement](javascript:;)
* [Reciprocal Teaching](javascript:;)
* Scaffolding of Learning
* [Authentic Assessment](javascript:;)
* [Collaborative Groups](javascript:;)
* [Project-Based Learning](javascript:;)

2. Participants will be able to do the following:

* Identify components of project-based learning.
* Compare and contrast project-based learning with traditional learning.
* Determine when project-based learning is appropriate.

3. Participants will understand the following key ideas:

* Project-based learning is based on the use of research-based strategies.
* Learning can be scaffolded in order for students to arrive at solutions and products.
* Authentic Assessment is used in project based learning.

**Outline of Content**

Module Introduction

Assessment Task

Task #1: Teacher Self-Assessment Inventory and Action Plan

Unit 1: Guidelines for Differentiating Instruction

Section 1: Introduction

Section 2: The Basics

Section 3: Responsive Learning Environment

Section 4: Clarity about the Learning Goal

Section 5: Continuous Assessment

Section 6: Flexible Grouping

Section 7: Respectful Work

Section 8: Conclusion

Assessment Tasks

Task #2: Guidelines of Differentiation in My Classroom

Task #3: Quiz

Unit 2: Developing Science Competence

Section 1: Introduction

Section 2:Current Research—What Do the Experts Say?

Section 3: Next Generation Sunshine State Standards (NGSSS)

Section 4: Next Generation Sunshine State Standards—Access Points for Students with Significant Cognitive Disabilities

Section 5: Barriers to and Misconceptions about Learning Science

Section 6: Conclusion

Assessment Task

Task #4: Factors That Influence Science Competence

Unit 3: Developing Clear Goals and Continuous Assessment

Section 1: Introduction

Section 2: Developing Clear Learning Goals

Section 3: Using Assessment Information to Design and Adjust Science Instruction

Section 4: Pre-Assessment

Section 5: Ongoing (Formative, Interim) Assessment

Section 6: Summative Assessment

Section 7: Conclusion

Assessment Tasks

Task #5: Developing Clear Learning Goals

Task #6: Designing a Pre-assessment

Unit 4: Designing Effective Lessons for Teaching of Initial Understanding

in a Whole-Group Setting

Section 1: Introduction

Section 2: What is Whole-Group Instruction?

Section 3: Effective Instructional Strategies for a Whole-Group Setting

Section 4: Effective Instructional Strategies for a Whole-Group Setting/Questioning

Section 5: Effective Instructional Strategies for a Whole-Group Setting/Active Engagement

Section 6: Effective Instructional Strategies for a Whole-Group Setting/Building Learning from Concrete to Abstract Levels

Section 7: Effective Instructional Strategies for a Whole-Group Setting/Scaffolding of Learning

Section 8: Effective Instructional Strategies for a Whole-Group Setting/Reciprocal Teaching

Section 9: Effective Instructional Strategies for a Whole-Group Setting/Children’s Literature

Section 10: Integration of Technology during Whole-Group Instruction

Section 11: Managing Whole-Group Instruction

Section 12: Conclusion

Assessment Task

Task #7: Whole-Group Science Mini-Lesson

Unit 5: The Differentiated Classroom—Responding to All Learners with Flexible Grouping

Section 1: Introduction

Section 2: Purposes, Important Considerations, and Effective Practices

Section 3: Making Small-Group Instruction More Explicit for Students Who Are Struggling

Section 4: Planning and Implementing Flexible Groups

Section 5: Continuous Assessment and Flexible Grouping in Science

Section 6: Conclusion

Assessment Task

Task #8: Quiz

Unit 6: Designing Effective Project-Based Learning Units

Section 1: Introduction

Section 2: What Is Project-Based Learning?

Section 3: How Does PBL Differentiate Science Instruction for All Learners?

Section 4: Steps for Design and Implementation of PBL

Section 5: The Roles of Teachers and Students

Section 6: Conclusion

Assessment Task

Task #9: Quiz

Unit 7: Tying It All Together: Where Do I Go From Here?

Section 1: Mrs. Rainey’s Self-Reflection

Section 2: Responsive Decision-Making Framework for Science

Assessment Tasks

Task #10: Reflection Assessment

Task #11: Putting It All Together…Your Final Assessment Task

Conclusion

User survey and other information

**Required Assessment Tasks**

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| --- | --- | --- | --- |
| **Task #** | **Unit #** | **Required Assessment Tasks** | **Due Date** |
| 1 | Module Introduction | Teacher Self-Assessment Inventory and Action Plan |  |
| 2 | 1 Guidelines for Differentiating Instruction | Guidelines of Differentiation in My Classroom |  |
| 3 | 1 Guidelines for Differentiating Instruction | Quiz |  |
| 4 | 2 Developing Science Competence | Factors That Influence Science Competence |  |
| 5 | 3 Developing Clear Goals and Continuous Assessment | Developing Clear Learning Goals |  |
| 6 | 3 Developing Clear Goals and Continuous Assessment | Designing a Pre-assessment |  |
| 7 | 4 Designing Effective Lessons for Teaching of Initial Understanding in a Whole-Group Setting | Whole-Group Science Mini-Lesson |  |
| 8 | 5 The Differentiated Classroom-Responding to All Learner with Flexible Grouping | Quiz |  |
| 9 | 6 Designing Effective Project-Based Learning Units | Quiz |  |
| 10 | 7 Tying It All Together: Where Do I Go From Here? | Reflection Assessment |  |
| 11 | 7 Tying It All Together: Where Do I Go From Here? | Putting it All Together….Your final Assessment Task |  |
|  | Conclusion | Required Activity – Complete PDA-ESE Satisfaction Survey |  |